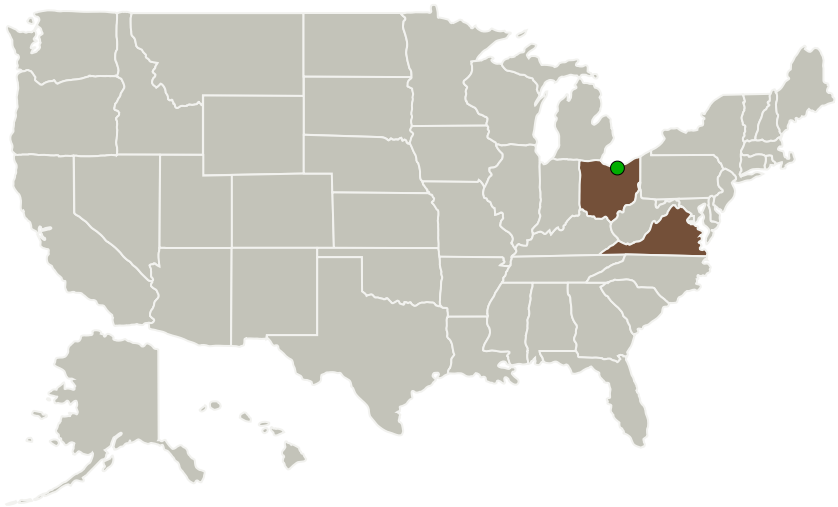
HybridSil Icephobic Nanocomposites for Next Generation Aircraft In-Flight Icing Measurement and Mitigation, Phase II

Completed Technology Project (2014 - 2016)

Project Introduction

The purpose of this SBIR program is to adapt NanoSonic's HybridSil® nanocomposites and combine high erosion resistance, low ice adhesion, and passive anti-icing functionality with Metal Rubber sensor technology to enable in-flight icing measurement and mitigation for next generation aircraft. During Phase I, NanoSonic successfully demonstrated novel sensor design concepts coupled with HybridSil® low ice adhesion passive anti-icing nanocomposite coatings. NanoSonic realized outstanding passive icing protection through icing wind tunnel testing, completely preventing ice formation in select conditions and with excellent ice shedding measured to -20°F. Low ice adhesion with outstanding erosion resistance was realized, retaining low ice adhesion properties following 500 mph rain erosion exposure. NanoSonic demonstrated exceptional icing event sensing capabilities in the icing wind tunnel, responding in near real time to environmental condition changes with negligible drift or hysteresis in test conditions spanning -4 to 26°F, 100 to 200mph windspeeds. Sensitivity to observe ice accretion onset and build, with distributed sensing of thickness and airspeed, was demonstrated in near real time. NanoSonic will build on these results to optimize, qualify and transition the technology through extensive development, testing, and prime partner interaction during Phase II.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nanosonic, Inc.	Lead Organization	Industry	Pembroke, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

Project Transitions

August 2014: Project Start

September 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137561)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nanosonic, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael J Bortner

Co-Investigator:

Michael Bortner

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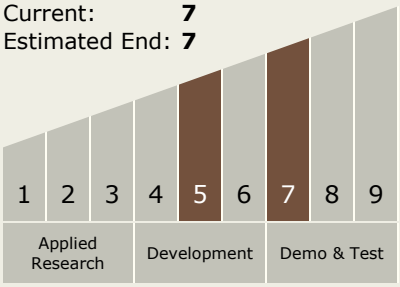
Images

Briefing Chart Image
HybridSil Icephobic Nanocomposites for Next Generation Aircraft In-Flight Icing Measurement and Mitigation, Phase II
(https://techport.nasa.gov/image/131613)

Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.8 Ground and Flight Test Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System